KEY TO THE FORESTED PLANT ASSOCIATIONS OF NORTHERN COLORADO AND SOUTHERN WYOMING

USDA Forest Service
Rocky Mountain Region
Lakewood, Colorado

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KEY TO THE FOREST (TREE-DOMINATED) PLANT ASSOCIATIONS OF NORTHERN COLORADO AND SOUTHERN WYOMING (ARAPAHO, MEDICINE BOW, ROOSEVELT, ROUTT, AND WHITE RIVER NATIONAL FORESTS)

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TABLE OF CONTENTS

KEY TO THE FOREST (TREE-DOMINATED)
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HOW TO USE THESE KEYS

1. The first key below is a KEY TO PLANT SERIES, followed by keys to plant associations within each series. After some experience in using the key to plant series, a user will find he/she no longer needs to use it, but can skip down to the appropriate place in the keys below. The keys to non-forest series (shrublands, grasslands, and alpine) will be written later.

2. Before using these keys, the user should make sure the sites (stands) have been delineated, that is, drawn on a map. This could be done using photointerpretation or other methods. The goal is to have sites (stands) that are fairly homogeneous in vegetation and site descriptors. In addition, the user should try to find a place within the stand which is better representative of the stand. In most forests, that often means the area of greatest canopy.

3. In an ideal case, a standard 375 m^2 plot should be set up, with or without 20 x 50 cm microplots, and canopy cover recorded (ocular estimate) by all plant species (Draft Forms R-2 2060-1A or 2060-2). A beginner should do this a few times, in order to get a good foundation in the use of canopy cover as the best way to quickly estimate the quantity of each species present. After getting this exercise behind him/her, the user can simplify the procedure to simply estimating canopy cover of the few (5-10) leading species, in a plotless way. It is important to remember in using these keys that canopy cover by species is the basis for vegetation.

4. These keys have been written for use in climax or near-climax stands, because "seral communities are not well organized" (Daubenmire 1952). This means that in stands at earlier seral stages it will be necessary for the user to use principles of succession to project the stand forward in time to climax or near-climax. Some major principles of succession that may prove useful:

a. Shade-tolerance relationships of tree species. If two tree species are both reproducing on the same stand, adequately to replace the stand, then the one that is more shade-tolerant will eventually dominate the stand. This principle does not apply everywhere, however: if the site is rocky or dry and hot, shade-tolerance will not be as important. In those cases, the species that are best adapted to the site will dominate.

b. Some forest associations will have a closed canopy at climax. Others will have a canopy that opens up as they approach climax.

c. In an earlier-seral stand, take some time to find the best-shaded spots in the stand, especially those under the canopies of the tree species that will eventually dominate the climax stand (these may only be seedlings or saplings).

d. No species is an indicator of climax everywhere it occurs. No species is an indicator of early seral conditions wherever it occurs.

5. After using the keys, and arriving at a plant association or two at the end, the tables and descriptions should always be consulted. "The key is not the classification" (Pfister et al. 1977). A comparative method is helpful here: compare two or more related associations for characters that seem to be diagnostic.

6. Descriptors such as elevation, slope angle, soil types, and distribution by National Forest, are based on the best available data from sample plots and observations. However, these descriptors are probably not the final answers, and should not be strictly interpreted. We expect ranges to be extended. For example, we expect an association to be found slightly outside the elevation limits listed for it; or an association may be found on a National Forest other than the ones listed here.

7. In these keys, an effort has been made to include only those characters that distinguish each association best, as far as possible. If more than one character is used for a lead in the key, the most important (useful diagnostic) character is listed first.

8. In reading these keys, please notice the difference between the various levels of abundance:

absent -- none.
present -- may only be a few plants.
uncommon
sparse
common
inconspicuous -- may be present
abundant
conspicuous

KEY TO PLANT SERIES

1. Tree species present .....(2)
1. Tree species absent ..KEY TO NON-FORESTED SERIES (LATER)

2. Trees present and dominating stand (closed canopy or open) .....(4)
2. Trees absent .....(3)

3. Tree species reproducing sufficiently to replace stand, or else stand had trees before recent disturbance.....(4)
3. Tree species not reproducing sufficiently to replace stand, or tree species accidental (a few, scattered, nonreproductive individuals), or a few trees invading/encroaching where there were no trees before .....KEY TO NON-FORESTED SERIES (LATER)

4. Riparian sites, on or near floodplains. Soils alluvial. Blue spruce or narrowleaf cottonwood dominant in the overstory or conspicuous in the understory reproduction..(5)
4. Neither riparian nor in floodplains, or if so then not dominated by blue spruce or narrowleaf cottonwood; neither of these two species reproducing, isolated accidental individuals only.....(6)

5. Blue spruce present and reproducing, at higher elevations (7300-8800 ft), with willows none to sparse .....BLUE SPRUCE SERIES, p. 5
5. Narrowleaf cottonwood present, blue spruce absent to occasional individuals, at lower elevations (5900-8000 ft), sometimes with willows...NARROWLEAF COTTONWOOD SERIES, p. 6

6. Relatively open forests on cold, rocky, very well-drained convex slopes of ridge shoulder and ridgetops. Limber pine or bristlecone pine dominant, other trees none, scattered, or isolated individuals.....(7)
6. Limber pine and bristlecone absent to isolated individuals.....(8)

7. Bristlecone pine abundant and conspicuous .....BRISTLECONE PINE SERIES, p. 6
7. Limber pine dominant.....LIMBER PINE SERIES, p. 7

8. Pinyon and/or tree juniper species present and often abundant, canopy usually open. Western slope of Continental Divide. Ponderosa pine absent.....(9)
8. Pinyon and tree junipers absent, on either slope of Divide. Canopy open or sometimes closed. Ponderosa pine sometimes present.....(10)

9. Rocky Mountain juniper conspicuous, canopy very open, on cold sites. Pinyon absent. Ponderosa pine or Douglas-fir occasionally present in small quantities
.....ROCKY MOUNTAIN JUNIPER SERIES, p. 8
9. Utah juniper and/or pinyon abundant, Rocky Mountain juniper absent to accidental, isolated individuals
.....UTAH JUNIPER-PINYON SERIES, p. 9

10. Coniferous trees none to sparse, isolated individuals, or not reproducing, and in any case, <20 stems/acre. Aspen abundant, replacing itself, either through multiple canopies of stems or else replacement over a few years when canopy breaks up. Soils relatively deep and loamy, or poorly-drained. Understory often lush, especially with many species of forbs .....ASPEN SERIES, p. 10
10. Aspen absent or present, sometimes dominating earlier-seral stands. If aspen is present, then >20 stems/acre of conifer trees, and they are apparently reproducing. Conifer trees abundant and reproducing sufficiently to replace stand, or apparently dominating stand. Soils often rocky, mostly well-drained but sometimes poorly-drained. Understory usually not lush with many species of forbs..(11)

11. Upper-elevation forests (7900-12300 ft) dominated by Engelmann spruce, subalpine fir, lodgepole pine, or aspen
.....(12)
11. Lower-elevation forests (5600-9300 ft) dominated by Douglas-fir or ponderosa pine.....(13)

12. Lodgepole pine dominant at climax; subalpine fir and Engelmann spruce absent to occasional, not reproducing sufficiently to replace stand. Soils often excessively well-drained, cold and very dry.....LODGEPOLE PINE SERIES, p. 13
12. Subalpine fir and/or Engelmann spruce dominant at climax. Lodgepole pine often dominates earlier-seral stands, but spruce and/or fir reproduction conspicuous. Soils sometimes well-drained but seldom excessively so, cold but usually moderately moist to wet
.....SUBALPINE FIR-ENGELMANN SPRUCE SERIES, p. 14

13. Douglas-fir present and reproducing, often dominant. Douglas-fir dominant at climax. Often on steep, northern slopes (especially at lower elevations) on either the Eastern or Western Slope of the Continental Divide
.....DOUGLAS-FIR SERIES, p. 20
13. Douglas-fir not reproducing sufficiently to replace stand. If Douglas-fir sometimes present, it is occasional/accidental or else is codominant with ponderosa pine at climax. Ponderosa pine abundant and reproducing
.....PONDEROSA PINE SERIES, p. 23

BLUE SPRUCE SERIES
(Picea pungens)

Key to the plant associations (climax or near-climax stands)

1. Understory prominently dominated by medium-height or tall shrubs; slightly alkaline soil (pH 7.6-8.1). Western slope ...BLUE SPRUCE/SASKATOON SERVICEBERRY-REDOSIER DOGWOOD (1)

1. Understory without any medium or tall shrubs; slightly acid soil (pH 6.0-6.6). Eastern slope ...BLUE SPRUCE/HEART-LEAF ARNICA (2)

CONSTANCY BY SPECIES FOR TWO BLUE SPRUCE PLANT ASSOCIATIONS
(CONSTANCY GIVEN FOR ZONE 5 SITES ONLY)

	P.A. NO.	(1)	(2)
T	Pipu	100	100
	Abla	80	75
	Psme	20	50
	Potr1	0	100
	Pico	0	75
S	Swse	100	0
	Amal	100	0
	Syor1	100	0
	Acgl	100	0
G	Cage1	100	0
F	Arco2	0	100
	Smst	100	100

ELEVATION IN ZONE 5..	7300-8500 ft	7500-8800 ft
SITE TEMPERATURE.....	M.Warm	M.Warm
SITE MOISTURE.....	Moist	Moist

NARROWLEAF COTTONWOOD SERIES
(Populus angustifolia)

Key to plant associations (climax or near-climax stands)

1. Western slope of the divide, with tall-shrub species conspicuous: serviceberry, chokecherry, and snowberry. Douglas-fir sometimes present, cow-parsnip absent to inconspicuous. Moderately alkaline soils (pH 7.5-8.4), fine to coarse textures (0-93% coarse) ...NARROWLEAF COTTONWOOD/SASKATOON SERVICEBERRY (2)

1. Eastern slope of the divide, with tall-shrub species conspicuous: willows, redosier dogwood, thinleaf alder, and river birch. Ponderosa pine sometimes present, cow-parsnip evident. Nearly neutral soils (pH 6.2-7.4), fine textures (0-10% coarse) ...NARROWLEAF COTTONWOOD/COYOTE WILLOW-RIVER BIRCH (1)

PLANT ASSOCIATION	ELEVATION IN ZONE 5	SITE TEMPERATURE	SITE MOISTURE	DISTRIBUTION CONT. DIVIDE
(1) Poan3/Saex-Befo	6700-8000 ft	M.Warm	Wet	E
(2) Poan3/Amal	5900-7300	M.Cool	Wet	W

BRISTLECONE PINE SERIES
(Pinus aristata)

Key to the plant associations (climax or near-climax stands)

1. Understory always well-developed, dominated by grasses, principally Thurber fescue or purple pinegrass. Canopy open, stands park-like, forbs sparse. Rare in Zone 5 ... BRISTLECONE PINE/THURBER FESCUE

1. Understory sparse and poorly-developed, or dominated by forbs; whiproot clover conspicuous ...BRISTLECONE PINE/WHIPROOT CLOVER

LIMBER PINE SERIES
(Pinus flexilis)

Key to the plant associations (climax or near-climax stands)

1. Purple pinegrass, whiproot clover, and/or Engelmann spruce present or conspicuous. Higher elevations, above 9700 ft in Subregion 5 .....(2)

1. Purple pinegrass, whiproot clover, and Engelmann spruce all absent or rare. Wax currant, spike-fescue, common juniper, and/or ponderosa pine present. Lower elevations, below 10000 ft in Subregion 5 .....(3)

2. Whiproot clover conspicuously dominant in the understory, with at least a few other species more characteristic of alpine than subalpine, such as alpine oreoxis, Whipple beardtongue, and greenleaf bluebells. Sometimes near timberline .....4. LIMBER PINE/WHIPROOT CLOVER

2. Purple pinegrass conspicuously dominant in the understory, more subalpine to upper montane in species composition. Usually not near timberline ....3. LIMBER PINE/PURPLE PINEGRASS

3. Spike-fescue prominent in the understory, if shrubs present then not common juniper; stands often adjacent to big sagebrush shrubland .....2. LIMBER PINE/SPIKE-FESCUE

3. Spike-fescue present or absent; common juniper conspicuous. Grasses are typically very sparse ..... 1. LIMBER PINE/COMMON JUNIPER

PLANT ASSOCIATION	ELEVATION ZONE 5, FT	SITE TEMPERATURE	SITE MOISTURE
LIMBER PINE/			
1. COMMON JUNIPER (Pifl/Juco)	8300-10000	M.Warm	Dry
2. SPIKE-FESCUE (Pifl/Hekl)	8700-10000	Moderate	Dry
3. PURPLE PINEGRASS (Pifl/Capu1)	9700-11000	M.Cold	Dry
4. WHIPROOT CLOVER (Pifl/Trda)	9700-11500	Cold	Dry

CONSTANCY BY SPECIES AND PLANT ASSOCIATION IN SUBREGION 5

P.A.	Pifl/ Juco	Pifl/ Heki	Pifl/ Capu1	Pifl/ Trda
T Pifl	100	100	100	100
Pico	44	0	0	0
Pipo	22	0	0	0
Potr1	33	0	0	0
Abla	22	0	0	50
Jusc	11	0	0	0
Pien1	0	0	50	75
S Juco	100	0	0	100
Aruv	55	0	0	0
Rice	67	80	0	0
G Heki	55	100	0	0
Capu1	33	0	100	100
F Trda	0	0	0	100

ROCKY MOUNTAIN JUNIPER SERIES
(Juniperus scopulorum)

Key to the plant associations (Potential Natural Community

1. Mountain-mahogany conspicuous on steep northerly slopes at lower elevations, 6300-7000 ft
.....ROCKY MOUNTAIN JUNIPER/MOUNTAIN-MAHOGANY (1)
1. Mountain-mahogany absent or only isolated individual plants, southerly (or less commonly north) slopes at higher elevations, 7000-8300 ft .....(2)

2. Bunchgrasses prominent: bluebunch wheatgrass, Indian ricegrass, or muttongrass; big sagebrush often present, but not dominant. Forbs few and sparse; bigflower cinquefoil, green beardtongue, and sulfur buckwheat all absent ...ROCKY MOUNTAIN JUNIPER/BLUEBUNCH WHEATGRASS (3)
2. Bunchgrasses present, but subordinate to big sagebrush or bitterbrush. Bluebunch wheatgrass absent, even in unmodified, relict stands at PNC. Several forbs prominent ....(3)

3. Bitterbrush prominent on coarse soils at somewhat lower elevations, 7000-8200 ft. Big sagebrush, Indian ricegrass, and wax currant absent to scattered individuals ...ROCKY MOUNTAIN JUNIPER/BITTERBRUSH (2)
3. Big sagebrush dominant on very coarse soils at somewhat high elevations, 7800-8300 ft. Bitterbrush, Griffiths wheatgrass, and mountain muhly usually all absent ...ROCKY MOUNTAIN JUNIPER/BIG SAGEBRUSH (4)

PLANT ASSOCIATION	ELEVATION IN ZONE 5	SITE TEMPERATURE	SITE MOISTURE	ASPECT
(1) Jusc/Cemo	6300-7000 ft	Warm	M.Dry	Northerly
(2) Jusc/Putr	7000-8200	M.Warm	Dry	Southerly
(3) Jusc/Agsp	7500-8300	M.Warm	Dry	All, mostly southerly
(4) Jusc/Artr	7800-8300	Moderate	Dry	Southerly

PINYON-UTAH JUNIPER SERIES
(Pinus edulis-Juniperus osteosperma)

Key to the plant associations and phases (Potential Natural Community

1. Gambel oak dominant in the understory, with elk sedge evident. Occasional, isolated Douglas-fir trees sometimes found. Bluebunch wheatgrass absent. Moderately deep soils ...PINYON/GAMBEL OAK (6)
1. Gambel oak, elk sedge, and Douglas-fir usually all absent or uncommon. Big sagebrush and bluebunch wheatgrass common to absent. Shallow to moderately shallow soils .....(2)

2. Mountain shrubs abundant and dominant: mountain-mahogany, Utah serviceberry, squaw-apple, greenleaf manzanita, and/or mountain snowberry conspicuous. Slightly higher elevations, 6400-8100 ft. Gambel oak sometimes present in small quantities.....(3)
2. Utah serviceberry absent to scattered individuals; squaw-apple and greenleaf manzanita absent. Mountain snowberry sometimes present, but inconspicuous. Slightly lower elevations, 5500-7300 ft. Gambel oak absent; mountain mahogany absent or codominant .....(5)

3. Mountain-mahogany and Utah serviceberry together dominant in shrub layer, the two species 12-29% cover. Pinyon more common than Utah juniper. Greenleaf manzanita and pityophila sedge sometimes present. Lower to middle slopes and rock outcrops .....(4)
3. Squaw-apple, mountain snowberry, and/or mountain-mahogany together dominant in shrub layer. Utah juniper more common than pinyon. Greenleaf manzanita and pityophila sedge absent. Upper slopes and ridges ...UTAH JUNIPER/ MOUNTAIN-MAHOGANY-SQUAWAPPLE (4)

4. Greenleaf manzanita and pityophila sedge present and conspicuous. Utah juniper occasionally not present ..... PINYON-UTAH JUNIPER/UTAH SERVICEBERRY-MOUNTAIN-MAHOGANY, PHASE GREENLEAF MANZANITA (5)
4. Greenleaf manzanita absent; pityophila sedge sometimes present but inconspicuous. Utah juniper always present ... PINYON-UTAH JUNIPER/UTAH SERVICEBERRY-MOUNTAIN-MAHOGANY, PHASE UTAH SERVICEBERRY (5)

5. Big sagebrush and/or mountain-mahogany dominant shrubs (total 25-30% cover), on shallow to moderately deep soils. Pinyon more abundant than Utah juniper, or equalling it... PINYON-UTAH JUNIPER/BIG SAGEBRUSH (2)
5. Big sagebrush often present, but at lower cover percent (0-18%); mountain-mahogany absent, on shallow soils. Utah juniper more abundant than pinyon .....(6)

6. Beardless bluebunch wheatgrass more prominent than Indian ricegrass .....
.....UTAH JUNIPER-PINYON/BEARDLESS BLUEBUNCH WHEATGRASS (1)
6. Indian ricegrass more prominent ...UTAH JUNIPER/INDIAN RICEGRASS (3)

PLANT ASSOCIATION	ELEVATION IN ZONE 5	SITE TEMPERATURE	SITE MOISTURE
(1) Juos-Pied/Agspi	5500-7100 ft	V.Warm	Dry
(2) Pied-Juos/Artr	6000-7000	Warm	Dry
(3) Juos/Orhy	6000-7300	Warm	M.Dry
(4) Juos/Cemo-Pera2	6400-7700	Warm	M.Dry
(5) Pied-Juos/Amut-Cemo	6400-8100	M.Warm	M.Dry
(6) Pied/Ouga	6900-7200	M.Warm	Moderate

ASPEN SERIES
(Populus tremuloides)

Key to plant associations and phases (climax to near-climax stands)

1. False-hellebore conspicuous in bottoms and depressions with very poorly-drained soils; fowl bluegrass present. Shrubs inconspicuous or absent ...ASPEN/FALSE-HELLEBORE (6)
1. False-hellebore and fowl bluegrass both absent or a few isolated individuals; soil drainage poor to well-drained. Shrubs sometimes conspicuous .....(2)

2. Moist depressions or moist benches, dominated by bracken fern, cow-parsnip, or Porter ligusticum; butterweed groundsel, Richardson geranium, and/or sweetroot often present .....(3)
2. Medium-sized to large stands on drier sites, slopes, ridges, or benches. Bracken fern, Richardson geranium, cow-parsnip, and butterweed groundsel usually not present, or if so, apparently subordinate to some other species ..(5)

3. Bracken fern conspicuously dominant on slightly acid (pH 5.1-6.0), shallow soils ...ASPEN/BRACKEN FERN (7)
3. Bracken fern absent or inconspicuous; more nearly neutral (pH 5.6-7.5), deep soils.....(4)

4. Cow-parsnip conspicuous, 38-47% cover; Porter ligusticum commonly also present in lesser quantities. Lower slopes, benches, and concave portions of slopes, with well-drained soils ...ASPEN/COW-PARSNIP (9)
4. Porter ligusticum conspicuous, 21-43% cover; cow-parsnip often also present in lesser quantities. Mid-slope benches and terraces, with poorly-drained soils ...ASPEN/LIGUSTICUM (10)

5. Medium-height and/or tall shrubs conspicuous: serviceberry, chokecherry, snowberry, and/or snowbrush ceanothus; grass and forb layers are often not visible as distinct layers because of interfering taller layer of shrubs. Mountain snowberry almost always present. Thurber fescue and pinegrass absent to isolated individuals only. Coarse to very coarse soils.....(6)
5. Medium-height and tall shrubs present, but in lesser than dominant quantities; serviceberry absent; grass or forb layers conspicuous. Site dominated by Thurber fescue, pinegrass, Fendler meadowrue, aspen peavine, or elk sedge. Fine to moderately coarse soils.....(11)

6. Snowbrush ceanothus conspicuous on upper to middle slopes and ridges on gentle to moderate slopes, with very coarse soils, very well-drained. Heartleaf arnica sometimes present. In southern Wyoming and northern Colorado, west slope of Park Range only ...ASPEN/SNOWBRUSH CEANOTHUS (2)
6. Snowbrush ceanothus and heartleaf arnica both absent. Serviceberry, chokecherry, and mountain snowberry dominant on middle to lower slopes and benches, on gentle to steep slopes, with coarse soils, poorly to moderately well-drained. Very common in western Colorado, southern Wyoming, and elsewhere .....(7)

7. Mountain snowberry forming a conspicuous medium-shrub layer; serviceberry and chokecherry as isolated individuals, either taller than or equal to snowberry in height. Middle slopes and benches, sometimes also lower slopes, gentle to moderate inclination. Moderately poorly-drained soils, 7400-9700 ft in s WY and n CO ...ASPEN/MOUNTAIN SNOWBERRY (8)
7. Mountain snowberry always present, but not forming a distinct layer; serviceberry and chokecherry conspicuous and much taller than the snowberry, often forming a thicket. Lower to middle slopes and benches, moderate to steep inclination. Moderately well-drained soils, 7000-9400 ft in s WY and n CO .....(8)

8. Rocky Mountain maple codominant with serviceberry and chokecherry in the shrub layer ...ASPEN/SERVICEBERRY-CHOKECHERRY, PHASE ROCKY MOUNTAIN MAPLE (5)
8. Rocky Mountain maple absent to isolated individuals ..(9)

9. Gambel oak conspicuous at lower elevations, moderately coarse, moderately well-drained soils ...ASPEN/SERVICEBERRY-CHOKECHERRY, PHASE GAMBEL OAK (5)
9. Gambel oak absent to inconspicuous .....(10)

10. Engelmann aster conspicuous, >5% cover, at higher elevations on steeper slopes, with less shrub cover. Gambel oak absent .....
ASPEN/SERVICEBERRY-CHOKECHERRY, PHASE ENGELMANN ASTER (5)
10. Engelmann aster <5% cover, middle elevations, very coarse and well-drained soils. Gambel oak sometimes present ...ASPEN/SERVICEBERRY-CHOKECHERRY, PHASE SERVICEBERRY (5)

11. Thurber fescue present and conspicuous; slender wheatgrass, mountain snowberry, and Oregon fleabane often present as well. Blue wildrye often conspicuous. Warm, dry sites, often in the rain-shadow of a mountain range ... ASPEN/THURBER FESCUE (4)
11. Thurber fescue absent. Slender wheatgrass, mountain snowberry, and Oregon fleabane all absent or inconspicuous. Blue wildrye absent. Cooler or moister sites .....(12)

12. Pinegrass conspicuously dominant; mountain snowberry absent. Acid soils, pH 5.2-5.4, from alluvial parent origins, sometimes northerly aspects, moderately poorly-drained. Uncommon, Medicine Bow NF ..ASPEN/PINEGRASS (3)
12. Pinegrass absent or inconspicuous; mountain snowberry present or absent. More neutral soils, pH 5.6-7.0, often non-northerly aspects, moderately well-drained. Common, n CO-s WY.....(13)

13. Moist well-drained, gentle to steep toeslopes with deep to very deep soils. Fendler meadowrue evident as one of a large number of grass and forb species (often >30 understory species on a site). Common in n CO and s WY ....ASPEN/ FENDLER MEADOWRUE (11)
13. Drier, well-drained, shallow to gentle slopes or benches with moderately-deep soils. Understory species diversity fair to poor .....(14)

14. Aspen peavine conspicuous; elk sedge often absent or sparse. Uncommon in n CO and s WY, isolated single stands ....ASPEN/ASPEN PEAVINE (1)
14. Elk sedge conspicuous; often aspen peavine present as well, at lesser quantities. Common in n CO and s WY ...ASPEN/ELK SEDGE (12)

PLANT ASSN.	ELEVATION IN ZONE 5 (ft)	SITE TEMPERATURE	SITE MOISTURE	SOIL DRAINAGE
1. Potr1/Lale	8000- 8800	M.Warm	M.Dry	
2. Potr1/Ceve	8000- 8800	M.Warm	Moderate	V.Well
3. Potr1/Caru1	8100- 8800	Moderate	M.Moist	M.Poor
4. Potr1/Feth	8500- 9300	Warm	M.Dry	Moderate
5. Potr1/Amal-Prvl	7000- 9400	M.Cool	M.Moist	Moderate
6. Potr1/Vete	8800	Cool	V.Moist	V.Poor
7. Potr1/Ptaq	7000- 9500	Cool	Moist	Poor
8. Potr1/Syor1	7400- 9700	Cool	M.Moist	M.Poor
9. Potr1/Hesp	7900- 9700	Cool	V.Moist	Well
10. Potr1/LIGU	8100- 9700	V.Cool	V.Moist	Poor
11. Potr1/Thfe1	8100-10300	Cool	V.Moist	Well
12. Potr1/Cage1	7700-10800	M.Cool to V.Cool	M.Moist	Well

LODGEPOLE PINE SERIES
(Pinus contorta)

Key to the plant associations (climax or near-climax stands)

1. Grouse whortleberry conspicuous and codominant in the understory, usually the only species prominent in the understory; Rocky Mtn. whortleberry absent. Upper elevations, 8800-10100 ft ...LODGEPOLE PINE/GROUSE WHORTLEBERRY (6)

1. Grouse whortleberry usually absent, but if present then other species besides grouse whortleberry also conspicuous; Rocky Mountain whortleberry present or absent. Lower elevations, 7900-9700 ft ..... (2)

2. Buffaloberry prominent as a medium-height shurb, with grouse whortleberry prominent in a lower layer ...LODGEPOLE PINE/RUSSET BUFFALOBERRY (4)

2. Buffaloberry and grouse whortleberry usually both absent. If one of these is present, they are clearly subordinate to other species ..... (3)

3. Understory patchy with the patches each dominated by a different species; one of these species is Rocky Mtn. whortleberry. Other species may be elk sedge, fringed brome, heartleaf arnica, grouse whortleberry, or silvery lupine ...LODGEPOLE PINE/ROCKY MOUNTAIN WHORTLEBERRY (3)

3. Rocky Mtn. whortleberry usually absent, but if present clearly subordinate to some other species in a large part of the stand ..... (4)

4. Sparse to very sparse understory, with very few species reaching 1% cover. Shrubs missing. Ross sedge is evident, but often has low cover percent ...LODGEPOLE PINE/ROSS SEDGE (5)

4. Not usually with very sparse understory, or if sometimes sparse, then low shrubs evident (common juniper and/or kinnikinnick) ..... (5)

5. Elk sedge dominant in the understory, often on sedimentary substrates. Bare soil cover none to very low (0-2%) ...LODGEPOLE PINE/ELK SEDGE (2)

5. Elk sedge usually absent, often on granitic substrates. Bare soil (2-14%) usually more prominent, understories sometimes sparse. Common juniper and/or kinnikinnick the most prominent species ...LODGEPOLE PINE/KINNIKINNICK-COMMON JUNIPER (1)

PLANT ASSOCIATION	ELEVATION IN ZONE 5	SITE TEMPERATURE	SITE MOISTURE
1. Pico/Aruv-Juco	8400- 9300 ft	M.Warm	Dry
2. Pico/Cagel	8200- 9200	Moderate	Dry
3. Pico/Vamy	8000- 9200	Moderate	M.Dry
4. Pico/Shca	7900- 9700	Moderate	Dry
5. Pico/Caro3	8700- 9500	M.Cold	M.Dry
6. Pico/Vasc	8800-10100	Cold	M.Dry

CONSTANCY BY SPECIES AND PLANT ASSOCIATION IN SUBREGION 5

P.A.NO.	1	2	3	4	5	6
T Pico	100	100	100	100	100	100
Potr1	60	40	67	38	0	0
Psme	40	7	0	13	0	0
Pipo	40	0	0	0	0	0
Plen1	20	13	0	25	100	59
Abla	0	33	0	31	100	92
S Juco	100	73	100	94	0	92
Aruv	100	47	0	50	0	0
Rowo	80	73	100	100	0	62
Mare	0	87	67	88	0	62
Vamy	0	0	100	44	0	0
Shca	0	0	0	100	0	0
Vasc	0	0	0	88	0	100
G Cagel	0	100	67	75	0	0
Caro3	60	0	0	50	100	77
F Arco2	80	73	100	81	100	77

SUBALPINE FIR-ENGELMANN SPRUCE SERIES
(Abies lasiocarpa-Picea engelmannii)

Key to the plant associations and phases (climax or near-climax stands)

1. Wet to very wet sites in drainageways or in wet pockets. Arrowleaf groundsel and/or bluejoint reedgrass conspicuously present.....(2)
1. Moist to dry sites, not with standing water nor high water tables at any season. Arrowleaf groundsel and bluejoint reedgrass both absent .....(3)

2. Bluejoint reedgrass conspicuous (21-62% cover), with a variety of sedges; arrowleaf groundsel often present, but clearly subordinate to bluejoint reedgrass; horsetail often present to conspicuous. Water table at or above surface for all of the growing season. Aspen may sometimes be seral ... SUBALPINE FIR-ENGELMANN SPRUCE/BLUEJOINT REEDGRASS (15)
2. Arrowleaf groundsel conspicuous (6-24% cover), with a large variety of other forbs; horsetail inconspicuous to absent. Water table is usually below the surface for some part of the growing season. Aspen is usually absent to very inconspicuous ...SUBALPINE FIR-ENGELMANN SPRUCE/ARROWLEAF GROUNDSEL (16)

3. Slow-growing forests at or just below timberline, sometimes krummholz in form. Subalpine fir absent or subordinate to Engelmann spruce. Either grayleaf willow or alpine clovers dominate the understory; in addition, other species are present that are more characteristic of alpine than of forests .....(4)
3. Forests usually well below timberline. If a fringe of krummholz trees is found at the upper end of the stand (in high-elevation associations), then neither grayleaf willow nor alpine clovers are prominent .....(5)

4. Subalpine fir absent or accidental (a few isolated individuals). Engelmann spruce usually krummholz shrub in form. Grayleaf willow, a moderately-tall shrub, conspicuous. Often grayleaf willow is mixed in with shrubby Engelmann spruce at about the same height. Alpine clovers absent or inconspicuous ...SUBALPINE FIR-ENGELMANN SPRUCE/GRAYLEAF WILLOW (18)
4. Subalpine fir more abundant but still subordinate to Engelmann spruce. Forest is partially formed of krummholz trees in a mixed pattern. Shrubs are usually absent; alpine clovers and other alpine herbs are characteristic of the patches between krummholz tree groups ...ENGELMANN SPRUCE/ WHIPROOT CLOVER (17)

5. Understory dominated by russet buffaloberry, twinflower, or thimbleberry. Myrtle pachistima often abundant. Lower elevations (below 10000 ft in Zone 5), with Douglas-fir often present. Skunkleaf polemonium and gooseberry currant usually absent; elk sedge usually not conspicuous.....(6)
5. Russet buffaloberry, twinflower, and thimbleberry all absent or a few isolated individuals. Myrtle pachistima sometimes present, but never conspicuous or abundant. Upper or lower elevations. Skunkleaf polemonium, gooseberry currant, or elk sedge sometimes prominent .....(13)

6. Few species present besides trees, most understory species at less than 1% cover, very sparse understory. Dwarf blueberry may be present ...SUBALPINE FIR-ENGELMANN SPRUCE/ MOSS (7)
6. At least some understory species prominent and several species at more than 1% cover. Dwarf blueberry usually absent .....(7)

7. Russet buffaloberry conspicuous, 5-30% cover; twinflower usually present as well, sometimes prominent in a low-shrub layer .....(8)
7. Russet buffaloberry absent or inconspicuous, a few scattered individuals at the edges of clearings, less than 5% cover; twinflower absent or inconspicuous .....(10)

8. Twinflower dominant in the understory, buffaloberry absent to less cover than twinflower. Lower elevations, 8700-9900 ft in Zone 5. Grouse whortleberry absent to conspicuous; lodgepole pine major seral to absent .....(9)
8. Twinflower present or absent, buffaloberry conspicuous. Higher elevations, 9300-10100 ft in Zone 5. Grouse whortleberry always present and dominant in a low shrub layer; lodgepole pine always the major seral tree .... SUBALPINE FIR-ENGELMANN SPRUCE/GROUSE WHORTLEBERRY, PHASE BUFFALOBERRY (6)

9. Grouse whortleberry co-dominant in a low shrub layer with twinflower; lodgepole pine major seral tree, Douglas-fir not very common. Often in an elevational belt above the next phase ...SUBALPINE FIR-ENGELMANN SPRUCE/TWINFLOWER, PHASE GROUSE WHORTLEBERRY (2)
9. Grouse whortleberry absent or occasional, less than 2% cover; twinflower usually the only prominent understory species; lodgepole pine occasional, Douglas-fir evident. Often in an elevational belt below phase Vasc ...SUBALPINE FIR-ENGELMANN SPRUCE/TWINFLOWER, PHASE TWINFLOWER (3)

10. Thimbleberry dominant and conspicuous, grouse whortleberry sometimes co-dominant in a low shrub layer. Myrtle pachistima sometimes present, but at low cover percent. Usually on sedimentary substrates ...SUBALPINE FIR-ENGELMANN SPRUCE/THIMBLEBERRY (4-5)
10. Thimbelberry absent or else present at low cover percent, grouse whortleberry absent or at low cover. Myrtle pachistima dominant (7-29% cover) or present at low cover percent .....(11)

11. Myrtle pachistima dominant in the understory; thimbleberry sometimes present at low cover percent. Lower elevations, the lowest in this series, 7900-9600 ft in Zone 5, steep to very steep slopes ...SUBALPINE FIR-ENGELMANN SPRUCE/MYRTLE PACHISTIMA (1)
11. Myrtle pachistima present, but at low cover percent, not dominant; thimbleberry usually absent. Higher elevations, 7900-10700 ft in Zone 5, flat to mod.-steep slopes .....(12)

12. Grouse whortleberry and heartleaf arnica co-dominant together ...SUBALPINE FIR-ENGELMANN SPRUCE/GROUSE WHORTLEBERRY, PHASE HEARTLEAF ARNICA (8)
12. Otherwise .....(13)

13. Few species present besides trees, Douglas-fir sometimes present at lower elevations; most understory species at less than 1% cover, very sparse understory. Dwarf blueberry may be present ...SUBALPINE FIR-ENGELMANN SPRUCE/MOSS (7)
13. At least some understory species prominent and at more than 1% cover; grouse whortleberry and/or elk sedge prominent .....(14)

14. Grouse whortleberry absent or at low cover percent (mostly <2% cover) .....(15)
14. Grouse whortleberry present and dominant in a low-shrub layer (12-63% cover) .....(18)

15. Elk sedge absent or at low cover (<7%); shrub layer well-developed, currant species dominant ...SUBALPINE FIR-ENGELMANN SPRUCE/CURRANT SPP. (14)
15. Elk sedge dominant in the understory, shrubs usually inconspicuous .....(16)

16. Engelmann spruce absent or a few accidental individuals only; currant species usually absent or only present in damper microsites within the stand. Heartleaf arnica usually absent ...SUBALPINE FIR/ELK SEDGE (9)
16. Engelmann spruce present and reproducing successfully; currant species sometimes present. Heartleaf arnica usually present, sometimes conspicuous .....(17)

17. Currant species conspicuous and dominant in the understory; grouse whortleberry absent ...SUBALPINE FIR-ENGELMANN SPRUCE/CURRANT SPP. (14)
17. Elk sedge conspicuous and dominant; heartleaf arnica usually also present ...SUBALPINE FIR-ENGELMANN SPRUCE/ELK SEDGE (10)

18. Skunkleaf polemonium conspicuous (2-3% cover) in the understory, grouse whortleberry also dominant in a low shrub layer. Higher elevations, above 9900 ft in Zone 5. Elk sedge absent or inconspicuous ...SUBALPINE FIR-ENGELMANN SPRUCE/GROUSE WHORTLEBERRY, PHASE SKUNKLEAF POLEMONIUM (13)
18. Skunkleaf polemonium absent or less than 2% cover. Elk sedge usually present, sometimes prominent. 8200-11700 ft in Zone 5 .....(19)

19. Grouse whortleberry usually conspicuous, elk sedge or heartleaf arnica usually not forming a higher layer. Both elk sedge and heartleaf arnica are usually present, but at low cover percent. Usually forming a broad belt comprising most of the upper subalpine zone, often above the belts of phase Cage1 or phase Arco2 ...SUBALPINE FIR-ENGELMANN SPRUCE/GROUSE WHORTLEBERRY, PHASE GROUSE WHORTLEBERRY (12)
19. Grouse whortleberry dominant in a low shrub layer, but elk sedge or heartleaf arnica form a higher-level layer. Usually in a lower-elevation belt, below phase Vasc ....(20)

20. Heartleaf arnica always present and dominant, 11-28% cover. Elk sedge usually present at 0-7% cover. Lodgepole pine or aspen may be seral species ...SUBALPINE FIR-ENGELMANN SPRUCE/GROUSE WHORTLEBERRY, PHASE HEARTLEAF ARNICA (8)
20. Elk sedge always present and dominant, 8-21% cover. Heartleaf arnica also present, at 3-8% cover, always subordinate. Lodgepole pine may be seral, rarely aspen ... SUBALPINE FIR-ENGELMANN SPRUCE/GROUSE WHORTLEBERRY, PHASE ELK SEDGE (11)

PLANT ASSOCIATION OR PHASE	ELEVATION IN ZONE 5	SITE TEMPERATURE	SITE MOISTURE
1. Abla-Plen1/Pamy	7900- 9600 ft	Warm	Moderate
2. Abla-Plen1/Libo ph. Vasc	8700- 9900 ft	M.Warm	M.Moist
3. Abla-Plen1/Libo ph. Libo	(lower)	Warm	Moist
4. Abla-Plen1/Rupa ph. Vasc	8200-10400 ft	M.Warm	M.Moist
5. Abla-Plen1/Rupa ph. Rupa	(same)		
6. Abla-Plen1/Vasc ph. Shca	9300-10100	Moderate	M.Dry
7. Abla-Plen1/moss	8800-10500	Cold	M.Dry
8. Abla-Plen1/Vasc ph. Arco2	8400-10300	M.Cold	M.Moist
9. Abla/Cage1	8900- 9800	Moderate	Moderate
10. Abla-Plen1/Cage1	7900-10700	Moderate	Moderate
11. Abla-Plen1/Vasc ph. Cage1	8700-11200	Moderate	Moderate
12. Abla-Plen1/Vasc ph. Vasc	8700-11700	Cold	M.Moist
13. Abla-Plen1/Vasc ph. Popu1	9900-11500	Cold	Moist
14. Abla-Plen1/RIBE	8700-11200	M.Cold	Moist
15. Abla-Plen1/Caca	9100-10000	Cold	V.Wet
16. Abla-Plen1/Setr	8900-11500	Cold	Wet
17. Plen1/Trda	10800-11300	V.Cold	Moist
18. Abla-Plen1/Sagl1	11200-12300	V.Cold	M.Wet

M. = Moderately
V. = Very

CONSTANCY BY SPECIES FOR EIGHTEEN ENGELMANN SPRUCE-SUBALPINE FIR PLANT ASSOCIATIONS
(CONSTANCY GIVEN FOR ZONE 5 SITES ONLY)

	FOOTNOTE		*	*	*	*		*											
	P.A. NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
T	Abla	100	100	100	100	100	100	93	100	100	100	100	99	100	100	100	94	75	14
	Plen1	100	90	90	100	100	100	100	100	0	100	100	94	90	100	100	100	100	100
	Psme	44	62	60	57	36	0	29	0	0	0	0	1	0	0	0	0	0	0
	Potr1	0	33	10	14	27	0	14	13	100	4	0	3	0	0	25	0	0	0
	Plco	0	0	80	0	0	100	0	50	33	0	50	48	10	0	25	56	0	0
S	Pamy	100	57	10	71	73	100	0	75	0	58	20	25	0	0	0	0	0	0
	Libo	0	100	100	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0
	Vasc[a]	56	95	20	100	55	100	0	100	0	40	100	98	80	0	100	61	0	86
	Rupa	33	0	0	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Shca	0	0	80	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0
	Vamy[b]	0	c	c	0	0	0	0	63	0	0	60	57	0	0	100	56	0	0
	RIBE	0	0	0	0	0	0	0	0	0	36	0	0	70	100	100	6	0	0
	Sagl1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100
G	Cagel	40	0	0	0	0	0	0	75	100	100	100	35	0	82	0	0	0	0
	Caca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	56	0	0
	Caro3	0	0	0	0	0	0	64	0	0	0	0	36	90	0	0	0	0	0
F	Arco2	67	57	100	100	100	100	0	100	0	92	100	86	30	100	100	89	0	0
	Popu1	0	0	0	0	0	0	0	0	0	0	0	22	100	64	0	83	0	100
	moss[d]	+	+	+	+	+	50	+++	100	+	+	60	51	10	100	++	+	+	+
	Setr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	100	0	0
	Trda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Footnotes. a. Also see Vamy, later in the table.
b. Rimo, Rila, and Riwo.
c. Included in Vasc, in the table above.
d. Many studies do not report moss cover.

DOUGLAS-FIR SERIES
(Pseudotsuga menziesii)

Key to plant associations (climax or near-climax stands)

1. Jamesia, Rocky Mountain maple, or mountain ninebark conspicuously dominant on steep north-facing canyonsides canyonsides and slopes of the eastern slope of the divide, 5900-8900 ft.....(2)
1. Neither jamesia, Rocky Mountain maple, nor mountain ninebark conspicuous, steep or shallow slopes. Western or eastern slope of the divide, 5700-9700 ft. If eastern slope of the divide, then understory dominated by pachistima, mountain snowberry, common juniper, or sedge .....(4)

2. Rocky Mountain maple conspicuously dominant on steep, moist slopes, often with myrtle pachistima or mountain snowberry. Bigflower cinquefoil, mountain ninebark, and Ross sedge absent; Jamesia inconspicuous or absent. Aspen sometimes present in small quantities ....DOUGLAS-FIR/ROCKY MOUNTAIN MAPLE (5)
2. Mountain ninebark and/or Jamesia conspicuously dominant, often with bigflower cinquefoil and Ross sedge present; myrtle pachistima, elk sedge, Gambel oak, and aspen absent. Mountain snowberry and Rocky Mountain maple absent or inconspicuous.....(3)

3. Mountain ninebark dominant on soils very close to neutral (pH 6.8-7.1). Jamesia sometimes conspicuous with ninebark. Mountain snowberry or spike-fescue sometimes present. Lower elevations, 5900-8100 ft ...DOUGLAS-FIR/MOUNTAIN NINEBARK (2)
3. Jamesia dominant on slightly acid soils (pH 6.2-6.8). Mountain ninebark clearly subordinate. Mountain snowberry and spike-fescue absent or rare. Upper elevations, 7200-9300 ft. .....DOUGLAS-FIR/JAMESIA (4)

4. Eastern slope of the divide. Understory dominated by sedge, common juniper, Rocky Mountain maple, or mountain snowberry .....(5)
4. Western slope of the divide. Understory dominated by mountain snowberry, pachistima, Rocky Mtn. maple, Gambel oak, kinnikinnick, elk sedge, or common juniper.....(8)

5. Rocky Mtn. maple dominant on steep lower slopes. Elk sedge absent to uncommon. Common juniper, Ross sedge, Rocky Mtn. juniper, and spike-fescue absent .....DOUGLAS-FIR/ROCKY MOUNTAIN MAPLE (5)
5. Rocky Mtn. maple absent to occasional, upper or lower slopes. Elk sedge, Rocky Mtn. juniper, Ross sedge, or spike-fescue present .....(6)

6. Elk sedge conspicuous and dominant, often with myrtle pachistima and/or mountain snowberry present. Sedimentary parent material ....DOUGLAS-FIR/ELK SEDGE (9)
6. Elk sedge absent. Myrtle pachistima and mountain snowberry usually absent. Metamorphic or sedimentary parent. Ross sedge and/or common juniper conspicuous ...(7)

7. Sparse to very sparse understories, with Ross sedge the most conspicuous species. Steep to very steep slopes. Common juniper fairly often present, but sparse. Metamorphic parent materials. .....DOUGLAS-FIR/ROSS SEDGE (1)
7. Common juniper and/or kinnikinnick conspicuously dominant, understory not usually very sparse. Ross sedge less evident or absent. Sedimentary or metamorphic parent .....DOUGLAS-FIR/KINNIKINNICK-COMMON JUNIPER (8)

8. Common juniper and/or kinnikinnick dominant in the understory, on flat to moderate slopes. Elk sedge, heartleaf arnica, pachistima, Rocky Mtn. maple, serviceberry, and mountain snowberry usually all absent .....DOUGLAS-FIR/KINNIKINNICK-COMMON JUNIPER (8)
8. Common juniper and kinnikinnick absent or subordinate to other species. Steep to very steep slopes. Mountain snowberry, elk sedge, pachistima, Gambel oak, serviceberry, or Rocky Mtn. maple conspicuous or dominant .....(9)

9. Rocky Mtn. maple dominant on steep northerly slopes; elk sedge absent or rare. Ponderosa pine occasionally present. Very uncommon on the western slope in Zone 5 ...DOUGLAS-FIR/ROCKY MOUNTAIN MAPLE (5)
9. Rocky Mtn. maple absent or inconspicuous; ponderosa pine absent; elk sedge often conspicuous .....(10)

10. Myrtle pachistima the most conspicuous understory species. Occasional aspen, Engelmann spruce, or subalpine fir may be present. Mountain snowberry absent to occasional.....DOUGLAS-FIR/MYRTLE PACHISTIMA (7)
10. Understory dominated by Gambel oak, mountain snowberry, and/or elk sedge; myrtle pachistima sometimes present, but at subordinate quantities. Aspen, Engelmann spruce, and subalpine fir usually all absent .....(11)

11. Gambel oak conspicuously dominant; heartleaf arnica absent. Mountain snowberry absent to occasional. Rock outcrops conspicuous. Rare on western slope in Zone 5 .....DOUGLAS-FIR/GAMBEL OAK (6)
11. Gambel oak absent or very minor; heartleaf arnica often present. Mountain snowberry and elk sedge always present, elk sedge always conspicuous .....(12)

12. Mountain snowberry conspicuous and dominant at lower elevations; elk sedge present in lesser quantities in a lower layer, 6200-8600 ft ...DOUGLAS-FIR/MOUNTAIN SNOWBERRY (3)
12. Elk sedge dominant, with mountain snowberry present at lower cover values; higher elevations, 7700-9200 ft ..... DOUGLAS-FIR/ELK SEDGE (9)

PLANT ASSOCIATION	ELEVATION IN ZONE 5	SITE TEMPERATURE	SITE MOISTURE	DISTRIBUTION CONT. DIVIDE
1. Psme/Caro3	5700-9700 ft	Warm	M.Moist	E
2. Psme/Phmo	5900-8100	Warm	M.Moist	E
3. Psme/Syor1	6200-8600	M.Warm	Moderate	W
4. Psme/Jaam	7200-9300	M.Warm	Moderate	E
5. Psme/Acgl	7200-8900[a]	M.Cool	M.Moist	E-NW
6. Psme/Quga	8100-8400	M.Cool	Moderate	W
7. Psme/Pamy	7100-8900	Cool	M.Moist	W
8. Psme/Aruv-Juco	7400-9400	M.Cool	M.Dry	E-SW
9. Psme/Cagel	7700-9200	M.Cool	Moderate	E-NW

a. Extrapolated from s CO-n NM

CONSTANCY BY SPECIES AND PLANT ASSOCIATION IN SUBREGION 5

P.A. NO.	1	2	3	4	5[a]	6	7	8	9
T Psme	100	100	100	100	91	100	100	93	100
Pipo	40	45	0	90	14	50	0	43	0
Jusc	30	64	50	30	0	100	37	17	40
Pifl	20	0	0	0	41	0	0	3	0
Pied	0	0	20	0	0	25	0	0	0
Pien1	0	0	0	10	0	0	37	23	0
Potr1	0	0	0	0	41	0	37	43	0
Abla	0	0	0	0	14	0	37	0	0
Plco	0	0	0	0	0	0	0	17	0
S Phmo	60	100	0	40	0	0	0	0	0
Syor1	0	45	100	0	82	50	79	0	100
Jaam	0	91	0	100	18	0	0	0	0
Acgl	0	0	0	30	100	0	63	0	60
Quga	0	0	60	0	55	100	26	0	0
Pamy	0	0	80	0	91	75	100	0	100
Aruv	0	0	0	0	0	0	0	60	0
Juco	90	0	0	0	0	0	42	97	60
G Caro3	100	73	40	75	0 †	100	$ 0	50	0
Cagel	0	0	100	0	23 †		$ 95	0	100
Hekl	75	64	0	0	0	0	0	43	0
F Drfl	80	75	0	100	0	0	0	43	0
Arco2	0	0	80	0	27	0	84	0	40

a. No studies from Zone 5, study from s Colorado reported instead.

PONDEROSA PINE SERIES
(Pinus ponderosa)

Key to the plant associations (climax or near-climax stands)

1. Rare, western slope sites; understory dominated by elk sedge or Gambel oak. Fremont geranium usually absent ...(2)
1. Common, eastern slope sites or dry intermountain valleys; elk sedge and Gambel oak both absent or inconspicuous. Fremont geranium common to absent .....(3)

2. Elk sedge conspicuous and dominant in the understory; Gambel oak absent or a few isolated individuals. Lower to middle gentle to steep slopes, with a tendency to northerly ...PONDEROSA PINE/ELK SEDGE (4)
2. Gambel oak conspicuous dominant in the understory; elk sedge present or absent in a lower layer. Middle to upper gentle to moderate slopes, with a tendency to southerly ...PONDEROSA PINE/GAMBEL OAK (9)

3. Lower-elevation sites (5600-7800 ft), dry and warm, only southerly aspects, dominated by sun sedge or mountain-mahogany. Spike-fescue, bitterbrush and aspen all absent; mountain muhly absent or inconspicuous. Thin soils .....(4)
3. Middle to higher-elevation sites (6200-9300 ft), moderately-dry and warm to moderately-moist and cool, all aspects including southerly, dominated by kinnikinnick, spike-fescue, common juniper, bitterbrush, Ross sedge, or mountain muhly. Aspen sometimes present. Mountain-mahogany and sun sedge absent to inconspicuous. Thin to moderately-deep soils .....(5)

4. Mountain-mahogany dominant on steep to moderate lower to middle slopes ...PONDEROSA PINE/MOUNTAIN-MAHOGANY (1)
4. Sun sedge dominant, shrubs inconspicuous, on gentle upper slopes, benches, and ridgetops ...PONDEROSA PINE/SUN SEDGE (2)

5. Kinnikinnick conspicuously dominant in the understory, with sparse grasses and forbs. Fremont geranium, mountain muhly, and bitterbrush absent to inconspicuous. Aspen sometimes seral, Douglas-fir uncommon. Medicine Bow NF ... PONDEROSA PINE/KINNIKINNICK (3)
5. Kinnikinnick absent or else other species apparently dominant. Fremont geranium, mountain muhly, or bitterbrush sometimes conspicuous or dominant. Aspen usually absent, Douglas-fir absent to codominant .....(6)

6. Spike-fescue conspicuously dominant, on lower to upper gentle to moderately-steep slopes. Mountain muhly, Ross sedge, and bitterbrush absent to uncommon .....PONDEROSA PINE/SPIKE-FESCUE (5)
6. Spike-fescue usually present but subordinate to mountain muhly, bitterbrush, or Ross sedge, on middle to upper gentle to steep slopes and benches. .....(7)

7. Bitterbrush conspicuous (4-24% cover) on slightly acid soils (pH 5.0-6.6), with low to moderate coarse content (12-35%), gentle to moderately-steep slopes. Grasses present, usually <8% cover for all grass species ... PONDEROSA PINE/BITTERBRUSH (6)

7. Bitterbrush absent to occasional (<2% cover) on nearly neutral soils (pH 6.0-6.8), with low to high coarse content (5-50%), gentle to steep slopes. Grasses dominant in the understory, usually >10% cover for all grass species ...(8)

8. Bunchgrasses conspicuous, mountain muhly dominant. Total grass cover usually >16%. Douglas-fir sometimes codominant in open-canopy ponderosa pine forest ...PONDEROSA PINE-DOUGLAS-FIR/MOUNTAIN MUHLY (8)

8. Bunchgrasses absent to very sparse, Ross sedge conspicuous in a sparse understory (total grass cover often <12%). Douglas-fir usually absent or present as scattered individuals in open to closed-canopy ponderosa pine forest ...PONDEROSA PINE/ROSS SEDGE (7)

PLANT ASSOCIATION	ELEVATION IN ZONE 5	SITE TEMPERATURE	SITE MOISTURE
1. Pipo/Cemo	5600-7800 ft	M.Warm	Dry
2. Pipo/Cahe1	6000-7200	Warm	Dry
3. Pipo/Aruv	6300-8400	Moderate	Dry
4. Pipo/Cage1	6100-8500	Moderate	M.Moist
5. Pipo/Hek1	7200-8600	M.Cool	Moderate
6. Pipo/Putr	6300-8800	Cool	Moderate
7. Pipo/Caro3	6200-9300	Cool	Dry
8. Pipo-Psme/Mumo1	7200-9100	Cool	M.Moist
9. Pipo/Ouga	6800-9300	M.Cool	M.Moist

CONSTANCY BY SPECIES AND PLANT ASSOCIATION IN SUBREGION 5

P.A.NO.	1	2	3	4	5	6	7	8	9[a]
T Pipo	62	100	100	100	100	100	100	100	100
Psme	8	50	0	33	50	80	38	50	27
Jusc	0	100	0	0	0	50	44	50	35
Potr1	0	0	80	67	0	0	0	13	0
S Cemo	100	0	0	0	0	0	25	0	0
Aruv	0	0	100	67	0	0	0	0	0
Putr	0	0	0	0	0	100	56	50	0
Ouga	0	0	0	0	0	0	0	0	100
G Cahe1	0	100	0	0	0	30	0	0	0
Caro3	100	0	0	0	0	100	100	75	0
Cage1	0	0	0	100	0	0	0	0	0
Hek1	0	0	80	67	100	80	69	63	0
Mumo1	38	0	0	0	0	80	75	100	73
F Geca	69	100	0	0	100	90	81	88	0

P.A. OR PHASE NAME	ZONE 5I X100 ft	A pH	LAND SHAPE	SLOPE ANGLE	ASPECT	PCT. ORGANIC	PCT. COARSE	RIS CODE
Abla-Plen1/Pamy /MYRTLE PACHISTIMA	79- 96	6.0-6.8	M-U slopes	Steep	Northerly	10-12	HIGH	00313
Abla-Plen1/Libo, Vasc /TWINFLOWER,WHORTLEBERRY	87 -99	4.9-6.8	M-L slopes	M.Steep	Northerly	7	2-21	003101
Abla-Plen1/Libo, Libo /TWINFLOWER,TWINFLOWER	82- 90		L slopes	Fla-Steep	Northerly	7	2-21	003100
Abla-Plen1/Rupa, Vasc /THIMBLEBERRY,WHORTLEBERRY	82-104		M slopes	Moderate	E-N-W		HIGH	003241
Abla-Plen1/Rupa, Rupa /THIMBLEBERRY,THIMBLEBERRY								003240
Abla-Plen1/Vasc, Shca /WHORTLEBERRY,BUFFALOBERRY	93-101	5.1-5.4	L sl. & benches	M.Gentle	N below, all above	3-6	HIGH	003216
Abla-Plen1/moss /MOSS	88-105		U-M slopes	M.Steep	N below, all above			00311
Abla-Plen1/Vasc, Arco2 /WHORTLEBERRY,ARNICA	84-103	4.9-5.7	L-M slopes	M.Steep	Northerly	1-7		003217
Abla/Cage1 /ELK SEDGE	89- 98	5.2-7.2	U slopes	M.Steep	Northerly	6	HIGH	00201
Abla-Plen1/Cage1 /ELK SEDGE	79-107	4.6-7.0	U sl. & benches	Moderate	All	1-6	10-34	00307
Abla-Plen1/Vasc, Cage1 /WHORTLEBERRY,ELK SEDGE	87-112	4.5-5.2	M-L slopes	M.Steep	All	3-4	40-60	003213
Abla-Plen1/Vasc, Vasc /WHORTLEBERRY,WHORTLEBERRY	87-117	3.8-6.6	M-U slopes	Moderate to steep	N below, all above	2-6	0-70	003210
Abla-Plen1/Vasc, Popu1 /WHORTLEBERRY,POLEMONIUM	99-115		M-U slopes	Moderate	All		25	003212
Abla-Plen1/RIBE /CURRANT	87-112	4.0-6.6	M-L slopes and benches	Moderate to steep	N below, all above	6-20	2-41	00322
Abla-Plen1/Caca /BLUEJOINT REEDGRASS	91-100	6.0-6.6	Toeslopes and moist benches	Moderate to flat	Northerly		13-15	00305
Abla-Plen1/Setr /ARROWLEAF GROUNDSEL	89-115	4.7-6.1	Pockets and bottoms	Flat to moderate	All		14-30	00316
Plen1/Trda /WHIPROOT CLOVER	108-113	5.2-5.8	U-M slopes	Moderate	Northerly		5-40	00413
Abla-Plen1/Sagl1 /GRAYLEAF WILLOW	112-123	4.8-5.4	U slopes	Moderate to steep	Protected		15-45	00323
Pipu/Amal-Swse /SERVICEBERRY-DOGWOOD	73- 85	7.6-8.1	L slopes and bottoms	Flat to moderate	All		0-15	00601
Pipu/Arco2 /HEARTLEAF ARNICA	75- 88	6.0-6.6	Bottoms and benches	Flat	Northerly		0-10	00602
Piar/Feth /THURBER FESCUE	105-123		M-U slopes	Moderate to steep	All		High	00801
Piar/Trda /WHIPROOT CLOVER	112-123	5.6-6.2	U-M slopes	Moderate	Southerly		High	00803
Pico/Aruv-Juco /KINNIKINNICK-JUNIPER	84- 93	5.4-6.2	L slopes and benches	Gentle	Non-N	1-5	10-35	00901
Pico/Cage1 /ELK SEDGE	82- 92	5.4-6.5	M-L slopes	Gentle to moderate	All		1-45	00903
Pico/Vamy /ROCKY MTN. WHORTLEBERRY	80- 92		M-L slopes	Moderate	All			00909
Pico/Shca /BUFFALOBERRY	79- 97	5.0-6.3	L slopes and benches	Gentle to moderate	All	1-4	0-66	00908
Pico/Caro3 /ROSS SEDGE	87- 95		L-M slopes	Moderate	All		Low	00911
Pico/Vasc /WHORTLEBERRY	88-101	5.0-6.0	M-U slopes and ridges	Moderate to steep	All	5-8	1-45	00910

P.A. OR PHASE NAME	SOIL DEPTH	SITE TEMPERATURE	SITE MOISTURE	ASSOCIATED TREES	DISTRIBUTION IN ZONE 5	PARENT	SOIL DRAINAGE
Abla-Plen1/Pamy	Shallow	Warm	Moderate	a Psme	WRNF, W slope	Sed.	Good
Abla-Plen1/Libo, Vasc	Shallow	M.warm	M.Moist	s Pico a Psme	WR-ANF, W slope	Var,non-calcar.	Good
Abla-Plen1/Libo, Libo	Shallow	Warm	M.moist	s Psme	WR-ANF, W slope	Var,non-calcar.	Good
Abla-Plen1/Rupa, Vasc	Deep to M.deep	M.warm	M.moist	a Psme a Potr1	WRNF, W slope	Sed.	Good
Abla-Plen1/Rupa, Rupa	Deep to M.deep	Warm	M.moist	s Psme	?	Sed.	Good
Abla-Plen1/Vasc, Shca		Moderate	M.dry	s Pico	WR-RTNF, W slope		
Abla-Plen1/moss		Cold	M.dry	a Potr1	ARNF,E slope (W to south)	Gran.	V.Good
Abla-Plen1/Vasc, Arco2	M.Deep	M.cold	M.moist	s Pico a-s Potr1	WR-RTNF, W slope	Sed. or Gran.	Good
Abla/Cage1	M.Deep	Moderate	Moderate	s Potr1	WRNF	Var.	Good
Abla-Plen1/Cage1	M.Deep	Moderate	Moderate	s Potr1	AR-RT-MB-WRNF,W slope	Sed. or Var.	Mod.
Abla-Plen1/Vasc, Cage1	Moderate	Moderate	Moderate	s Pico	WR-RT-MBNF W slope		
Abla-Plen1/Vasc, Vasc	Shal. to V.shal.	Cold	M.Moist	s Pico	All Forests W-E slopes	All,non-calcar.	Good
Abla-Plen1/Vasc, Popu1	M.Shal. to mod.	Cold	Moist	s Pico a Pifl	AR-MBNF E-W slopes		Good
Abla-Plen1/RIBE	M.Shal.	M.Cold	Moist		WRNF,W slope (E to south)	Calcar. or Gran.	
Abla-Plen1/Caca	M.Deep	Cold	V.Wet	s Potr1 a Pico	AR-WR-RTNF W slope	Var,non-calcar.	Poor
Abla-Plen1/Setr	M.Deep	Cold	Wet	s Pico	ARNF,E slope (W to north)	Gran. or Ign.	Poor
Plen1/Trda	Shallow	V.Cold	Moist	a Piar a Pifl	ARNF E slope	Gran.	
Abla-Plen1/Sagl1	Shallow	V.Cold	M.Wet	a Piar	AR-WRNF E slope	Igneous or Sed.	
Pipu/Amal-Swse	M.Deep	M.Warm	Moist	aAbla,Psme a Poan3	WRNF	Var.	Poor
Pipu/Arco2	Deep	M.Warm	Moist	a Potr1 aAbla,Pico	ARNF	Var.	Poor
Piar/Feth	V.Shal.	V.Cold	M.Dry	a Pifl a Abla	E slope (E-W to sou)	Var.	Good
Piar/Trda	V.Shal.	V.Cold	Moderate	a Plen1	ARNF E slope	Gran.	V.Good
Pico/Aruv-Juco	M.Deep	M.Warm	Dry	a Potr1	AR-MBNF E slope	Gran.	V.Good
Pico/Cage1	M.Deep to deep	Moderate	Dry	s Potr1	AR-WR-MBNF W slope	Sed. or Gran.	Good
Pico/Vamy	M.Deep to deep	Moderate	M.Dry	s Potr1	AR-WRNF W slope	Gran.	Good
Pico/Shca	Shal. to M.Deep	Moderate	Dry	s Potr1 aAbla,Plen1	AR-WR-RT-MB E-W slopes	Var.	Good
Pico/Caro3	Shallow	M.Cold	M.Dry	a Abla a Plen1	MBNF	Gran.	V.Good
Pico/Vasc	Shallow	Cold	M.Dry	a Plen1 a Abla	MB-ARNF W slope	Gran.	Good to V.Good

P.A. OR PHASE NAME	ZONE 5I X100 ft	A pH	LAND SHAPE	SLOPE ANGLE	ASPECT	PCT. ORGANIC	PCT. COARSE	RIS CODE	P.A. OR PHASE NAME	SOIL DEPTH	SITE TEMPERATURE	SITE MOISTURE	ASSOCIATED TREES	DISTRIBUTION IN ZONE 5	PARENT	SOIL DRAINAGE
Pifl/Juco /COMMON JUNIPER	83-100	4.8-7.6	U-M slopes and ridges	Moderate	Non-N	0-3	27-65	01005	Pifl/Juco	Shallow	M.Warm	Dry	Pico Pipo Potr1 Abla	AR-RT-MBNF E-W slopes	Var.	Good
Pifl/Hek1 /SPIKE-FESCUE	87-100	6.4-8.1	M-U slopes and ridges	Shallow to moderate	Non-N		15-75	01004	Pifl/Hek1	M.Shal.	Moderate	Dry		MBNF E-W slopes	Var.	Good to V.Good
Pifl/Capu1 /PURPLE PINEGRASS	97-110	6.2-6.8	U slopes and ridges	Shallow to moderate	Non-N		30-40	01002	Pifl/Capu1	Shal. to V.Shal.	M.Cold	Dry	Plen1	ARNF E slope	Gran.	V.Good
Pifl/Trda /WHIPROOT CLOVER	97-115	5.4-6.8	M-U slopes	Moderate to steep	All		30-40	01006	Pifl/Trda	Shallow	Cold	Dry	Plen1 Abla	ARNF E slope	Gran.	Good
Pipo/Cemo /MOUNTAIN-MAHOGANY	56- 78	5.6-7.0	L-M slopes	Moderate to steep	Southerly		20-45	01107	Pipo/Cemo	Shallow	M.Warm	Dry	a Psme	ARNF E slope	Var.	Good
Pipo/Cahe1 /SUN SEDGE	60- 72	5.9-6.2	U slopes, benches and ridges	Gentle	Southerly			01126	Pipo/Cahe1	Shallow	Warm	Dry	a Psme	ARNF E slope	Gran.	Good
Pipo/Aruv /KINNIKINNICK	63- 84		L-U slopes, benches and ridges	Moderate to steep	All		0-60	01140	Pipo/Aruv	M.Deep to Shal.	Moderate	Dry	s Potr1	MBNF,E slope (W-E to sou)		
Pipo/Cage1 /ELK SEDGE	61- 85	6.4	L-M slopes	Gentle to steep	All (nor-therly)	8-15	0-40	01105	Pipo/Cage1	M.Deep	Moderate	M.Moist	s Potr1 Psme Pico	MB-WR-RTNF W slope	Var.	Good
Pipo/Hek1 /SPIKE-FESCUE	72- 86	5.8-6.6	L-U slopes	Gentle to moderate	All		0-35	01111	Pipo/Hek1	M.Deep	M.Cool	Moderate	a Psme a Pifl	ARNF E slope	Ign. or Metam.	
Pipo/Putr /BITTERBRUSH	63- 88	5.0-6.6	M-U slopes and benches	Gentle to moderate	All		12-35	01120	Pipo/Putr	Moderate	Cool	Moderate	d Psme a Jusc	ARNF,E-W slo (W to north)	Met. or Igneous	
Pipo/Caro3 /ROSS SEDGE	62- 93	6.0-6.7	M-U slopes	Gentle to moderate	All (sou-therly)		5-50	01106	Pipo/Caro3	M.Deep	Cool	Dry	a Jusc a Psme	AR-MBNF E slope	Var. (Gran.)	V.Good
Pipo-Psme/Mumo1 /MOUNTAIN MUHLY	72- 91	6.2-6.8	U slopes, benches and mesas	Gentle to steep	All (sou-therly)		35-45	01117	Pipo-Psme/Mumo1	Shal. to M.Deep	Cool	M.Moist	d Psme aJusc,Pifl	ARNF E slope	Gran. or Igneous	
Pipo/Quga /GAMBEL OAK	68- 93	5.2-6.6	M-U slopes, benches and mesas	Gentle to moderate	All (sou-therly)		10	01121	Pipo/Quga	Shal. to M.Deep	M.Cool	M.Moist	d-a Psme a Jusc	WRNF W slope	Sed.	Poor
Psme/Caro3 /ROSS SEDGE	57- 97	6.6-6.8	U-M slopes	Steep to V.steep	Northerly		20-35	01204	Psme/Caro3	M.Deep	Warm	M.Moist	a Pipo a Jusc	ARNF E slope	Gran.	Good
Psme/Phmo /MOUNTAIN NINEBARK	59- 81	6.8-7.1	L-M slopes and ravines	Moderate to steep	Northerly	7-12	25-35	01213	Psme/Phmo	M.Deep	M.Warm	M.Moist	a Pipo a Jusc	ARNF,E slope (W in north)	Gran.	
Psme/Syor1 /MOUNTAIN SNOWBERRY	62- 86	5.4-8.0	U-M slopes and ravines	Steep to V.steep	Northerly	8-10	12-75	01217	Psme/Syor1	Shal. to V.Deep	M.Warm	Moderate	a Jusc a Pied	WRNF W slope	Sed., Limes.	V.Good
Psme/Jaam /JAMESIA	72- 93	6.2-6.8	L-M slopes	V.Steep	All (nor-therly)		25-30	01209	Psme/Jaam	M.Deep	M.Warm	Moderate	a Pipo a Jusc	ARNF E slope	Gran.	Good
Psme/Acgl /MAPLE	72-89[a]	5.9-7.2	L-M-U slopes and canyons	Moderate to steep	Northerly		14-19	01201	Psme/Acgl	Shallow to Mod.	M.Cool	M.Moist	s Potr1 s Pipo	WRNF W slope	Var.	
Psme/Quga /GAMBEL OAK	81- 84		M-U-L slopes, canyons & benches	Steep	Southerly			01214	Psme/Quga	Shallow	M.Cool	Moderate	a Jusc a Pipo	WRNF W slope	Sed.	
Psme/Pamy /MYRTLE PACHISTIMA	71- 89	5.7-7.4	Slopes	Steep to V.steep	Northerly	2-11	7-25	01211	Psme/Pamy	M.Deep	Cool	M.Moist	a Plen1 aAbla,Jusc	WR-RTNF W slope	Sed.	V.Good
Psme/Aruv-Juco /KINNIKINNICK-JUNIPER	74- 94	6.9	M-U slopes and ridges	Flat to M.steep	All (non-north)		1-36	01219	Psme/Aruv-Juco		M.Cool	M.Dry	a Potr1	ARNF,E slope (W to south)	Sed. or Metam.	
Psme/Cage1 /ELK SEDGE	77- 92	5.2-7.2	M-U slopes	Steep to V.steep	Northerly		5-45	01206	Psme/Cage1	M.Deep	M.Cool	Moderate	a Jusc	A-WRNF W slope	Sed.	
Poan3/Saex-Befo /COYOTE WILLOW-BIRCH	67- 80	6.2-7.4	Bottoms and lower benches	Flat to shallow	All		0-10	10302	Poan3/Saex-Befo	Deep	M.Warm	Wet	Jusc Pipo Potr1 Pipu	ARNF,E slope (W to N & S)	Var.	Poor
Poan3/Amal /SERVICEBERRY	59- 73	7.5-8.4	Bottoms and lower benches	Flat to shallow	Westerly		0-93	10301	Poan3/Amal	Deep	M.Cool	Wet	Jusc Psme Pipu Pied	WRNF	Var.	M.Poor

P.A. OR PHASE NAME	ZONE 5I X100 ft	A pH	LAND SHAPE	SLOPE ANGLE	ASPECT	PCT. ORGANIC	PCT. COARSE	RIS CODE
Potr1/Lale	80- 88	5.7-6.2	M-L slopes and benches	Gentle	All	3-5		10505
/ASPEN PEAVINE								
Potr1/Ceve	85- 88		U-M slopes and ridges	Gentle to moderate	Non-N		V.High	10516
/SNOWBRUSH CEANOTHUS								
Potr1/Caru1	81- 88	5.2-5.4	L slopes and alluvial benches	Moderate	All (nor-therly)	3-4		10517
/PINEGRASS								
Potr1/Feth	85- 93	6.0-7.4	L slopes, concave	Moderate to steep	Non-N		4-15	10503
/THURBER FESCUE								
Potr1/Amal-Prvl	70- 94	5.9-6.3	L-M concave slopes & benches	Moderate to steep	Non-N	4-32		10515
/SERVICEBERRY-CHOKECHERRY								
Potr1/Vete	88	5.6-6.1	Bottoms and lower slopes	Gentle	All, Non-N	5-8		10513
/FALSE-HELLEBORE								
Potr1/Ptaq	70- 95	5.1-6.0	L concave slopes and depressions	Gentle to steep	All, Non-N	3-7	Low to high	10510
/BRACKEN FERN								
Potr1/Syor1	74- 97	5.9-7.5	M-L concave slopes and benches	Gentle to moderate	All, Non-N	4-18	3-40	10511
/MOUNTAIN SNOWBERRY								
Potr1/Hesp	79- 97	5.6-7.5	L concave slopes and benches	Gentle	All	3-10	0-20	10504
/COW-PARSNIP								
Potr1/LIGU	81- 97	6.0-6.2	M slopes, benches and terraces	Gentle to moderate	All	5-10	Low	10518
/LIGUSTICUM								
Potr1/Thfe1	81-103	5.6-7.0	L-M concave protected slopes	Gentle to steep	All	3-22	0-20	10512
/MEADOW-RUE								
Potr1/Cage1	77-108	6.0-6.2	L-M slopes, slumps & benches	Gentle to moderate	All	2-6	0-20	10501
/ELK SEDGE								
Jusc/Cemo	63- 70	6.6-7.2	Exposed rock	Steep	Northerly		30-40	20304
/MOUNTAIN-MAHOGANY								
Jusc/Putr	70- 82	6.6-6.8	Exposed rock	Steep to V.steep	Southerly		33-45	20306
/BITTERBRUSH								
Jusc/Agsp	75- 83	7.7	Exposed rock	Steep	All, mostly S		21-50	20303
/BLUEBUNCH WHEATGRASS								
Jusc/Artr	78- 83	7.0-7.6	Exposed rock	Steep to V.steep	Southerly		45-55	20302
/BIG SAGEBRUSH								
Juos-Pied/Agspl	66- 71		U slopes and ridgetops	Gentle				20201
/BEARDLESS BLUEBUNCH WHEATGRASS								
Pied-Juos/Artr	60- 70	7.1		Gentle	Non-S	4	5-15	20401
/BIG SAGEBRUSH								
Juos/Orhy	60- 73		Exposed rock			Low	High	20204
/INDIAN RICEGRASS								
Juos/Cemo-Pera2	64- 77	7.4-8.4	U slopes and ridgetops	Gentle to steep	Southerly		0-40	20203
/MOUNTAIN-MAHOGANY-SQUAWAPPLE								
Pied-Juos/Amut-Cemo	64- 81	8.0-8.4	L slopes and rock outcrops	Moderate to V.steep	Southerly		0-42	20403
/SERVICEBERRY-MOUNTAIN-MAHOGANY								
Pied/Quga	69- 72	7.0-8.2	L-M-U slopes, benches & mesas	Gentle to V.steep	S above, N below		0-13	20404
/GAMBEL OAK								

P.A. OR PHASE NAME	SOIL DEPTH	SITE TEMPERATURE	SITE MOISTURE	ASSOCIATED TREES	DISTRIBUTION IN ZONE 5	PARENT	SOIL DRAINAGE
Potr1/Lale		M.Warm	M.Dry	a Abla	MB-RTNF		
Potr1/Ceve	Shallow to Deep	M.Warm	Moderate		RTNF		V.Good
Potr1/Caru1		Moderate	M.Moist	a Pico	RT-MBNF W slope	Sed.	M.Poor
Potr1/Feth	M.Deep	Warm	M.Dry		AR-WR,W slo.(E to south)	Var.	Moderate
Potr1/Amal-Prvl	Moderate	M.Cool	M.Moist	a Psme	RT-WRNF W slope	Sed. & Gran.	Moderate
Potr1/Vete	M.Deep	Cool	M.Moist	a Abla	AR-RTNF		V.Poor
Potr1/Ptaq	Moderate	Cool	Moist	a Abla	RT-WRNF W slope		Poor
Potr1/Syor1	Moderate to Deep	Cool	M.Moist	a Psme a Abla	RT-WRNF W slope	Sed. & Gran.	M.Poor
Potr1/Hesp	Deep	Cool	V.Moist	a Abla	RT-WRNF W slope	Sed.	Good
Potr1/LIGU	Deep	V.Cool	V.Moist		RT-MB-WR-AR W slope		Poor
Potr1/Thfe1	V.Deep	Cool	V.Moist	a Abla aPico,Pifl	RT-AR-WRNF W slope	Sed.	Good
Potr1/Cage1	M.Deep to Deep	M.Cool to V.Cool	M.Moist	a Pico aAbla,Pifl	MB-AR-WR-RT W slope	Sed. or Var.	Good
Jusc/Cemo	Shallow	Warm	M.Dry	a Psme a Pipo	ARNF	Metam.	
Jusc/Putr	M.Shal.	M.Warm	Dry	a Psme a Pipo	ARNF	Metam.	
Jusc/Agsp	M.Shal.	M.Warm	Dry		? W slope	Metam.	
Jusc/Artr	Shallow	Moderate	Dry	a Pipo a Psme	ARNF	Metam.	
Juos-Pied/Agspl		V.Warm	Dry	Jusc	? W slope	Sands., Marls.	
Pied-Juos/Artr	Shallow to Mod.	Warm	Dry		? W slope	Sands., Shale	Good
Juos/Orhy	Shallow	Warm	M.Dry		? W slope	Shale, Sands.	Moderate
Juos/Cemo-Pera2	M.Shal.	Warm	M.Dry		WRNF W slope	Sands., Shale	Good
Pied-Juos/Amut-Cemo	Shallow	M.Warm	M.Dry		WRNF W slope	Sands., Marls.	Good
Pied/Quga	M.Deep to deep	M.Warm	Moderate	a Psme	WRNF W slope	Sed., Limes.	Good

a. Elevation extrapolated from s Colorado study.

P.A. OR PHASE NAME	TREE PROD ft³/ac/yr (PNC)	B.A. ft²/ac	S.I. SP./BY PIEN1/100	LIVESTOCK FGE PROD (PNC)	LIVESTOCK FGE PROD (MID SERL)	BIG GAME HABITAT KIND	BIG GAME HABITAT POTENTL
Abla-Pien1/Pamy		138-217-250	46-47-49	V.Low	V.Low		Trans.
Abla-Pien1/Libo, Vasc	18-60-95	189- -284	49-57-73	V.Low	Low	Summer MD-E-M-B	Moderate to High
Abla-Pien1/Libo, Libo				V. Low	Low	Summer MD-E-M-B	Moderate to High
Abla-Pien1/Rupa, Vasc	38-57-77		65-85-95	Low	Fair	Summer E-MD	High
Abla-Pien1/Rupa, Rupa				Low	Fair		
Abla-Pien1/Vasc, Shca		125- -147		Low	Low	Summer	Fair?
Abla-Pien1/moss	Low	-327-	43-53-64	V.Low	Low	Summer E	Poor
Abla-Pien1/Vasc, Arco2	10-49-117	60-194-369	46-79-101	Low	Fair	Summer	Fair?
Abla/Cage1	Low	178-256-285		M.Low	Moderate		
Abla-Pien1/Cage1	27-51-91	194-253-357	47-69-90	M.Low	M.High	Sum-Win MD-E	Poor or Trans.
Abla-Pien1/Vasc, Cage1		157-280-409	-62-	M.Low	M.Fair		
Abla-Pien1/Vasc, Vasc	15-49-87	130-200-345	19-55-95	V.Low	Fair	Sum,cov. E,MD	Moderate
Abla-Pien1/Vasc, Popu1		<305- -360	52- -60	V.Low	M.Low	Sum,rest BH	High
Abla-Pien1/RIBE	31-48-93	34-188-525	59-76-112	V.Low	Fair	Sum,cov-rest,E-MD	Moderate
Abla-Pien1/Caca	11-54-92	148-191-250	38-45-56	Fair	Moderate	Sm,E-MD-BH	High
Abla-Pien1/Setr	84-97-108	178-252-305	41-52-60	Fair	Moderate	Year,M	High
Pien1/Trda		188-217-246	30-32-34	V.Low	Fair	Sum,E Sum-Win,MH	High High
Abla-Pien1/Sagl1	V.Low	(krummholz)		Low	Fair	Sum,Cov MD-E Win-Sum BH	Moderate to High M.High
Pipu/Amal-Swse		263-290-332		Moderate	Fair	Sum,E-MD Win,E-MD	Low Moderate
Pipu/Arco2		169-286-367		Low	Fair	Sum,E-MD Win,E-MD	Low Moderate
Piar/Feth			-53-	M.High	Moderate	Sum E	High
Piar/Trda		205-266-278		V.Low	Fair	Win,BH Sum,E	Low Moderate
Pico/Aruv-Juco	12-42-56	80-136-175	PICO/100 36-57-86	V.Low	Low	Sum,MD BH	High V.Low
Pico/Cage1		165-187-215	47-64-78	M.Fair	Fair	All	Poor
Pico/Vamy	46-49-53		73-75-78	Low	Fair	Win,All	Moderate to Low
Pico/Shca		109-154-388	43-62-90	Low	Low	Win,MD-E	Fair
Pico/Caro3			60- -70	V.Low	V.Low	All	Poor
Pico/Vasc	31-47-67	116-171-245	44-60-89	Low	Fair	Sum, MD-E-M	Moderate to Fair

P.A. OR PHASE NAME	TREE PROD ft^3/ac/yr (PNC)	B.A. ft^2/ac	S.I. SP./BY	LIVESTOCK FGE PROD (PNC)	LIVESTOCK FGE PROD (MIDSERL)	BIG GAME HABITAT KIND	BIG GAME HABITAT POTENTL
			PSME/50				
Plfl/Juco	9-20-29	54-102-218	18-25-32	V.Low	V.Low	Win,MD Trans,BH	High M.High
Plfl/Hekl	8-13-23	96-121-146	-25-	M.High	M.High	Year,MD Trans,BH	Moderate Mod.-High
Plfl/Capu1		57-109-130		M.Fair	M.Fair	Trans,BH	High
Plfl/Trda		178-202-245		V.Low	V.Low	Sum,E	M.High
			PIPO/100				
Pipo/Cemo		52- 83-109	36-39-41	Low	V.Low	Win,MD Win,BH	M.High High
Pipo/Cahe1		- 62-		Fair	Fair		
Pipo/Aruv			40-58-70	V.Low	V.Low		
Pipo/Cage1		170- -232	48-60-75	Moderate	M.High	Win-Sum MD	Moderate
Pipo/Hekl		143-170-203	39-44-49	Moderate	Moderate		
Pipo/Putr	5-18-33	44-108-153	41-42-48	M.Low	Moderate	Win,MD-E Sum,MD	High V.High
Pipo/Caro3		26-134-207	34-41-50	V.Low	V.Low		
Pipo-Psme/Mumo1		26- 70-176	26-42-66	M.High	M.High	Trans,BH Lamb,BH	High High
Pipo/Quga		70- - 93	43-54-68	Moderate	Moderate	Year,MD	High
			PSME/50				
Psme/Caro3		52-124-240	26-30-34	V.Low	V.Low	Win,MD-E	M.Low
Psme/Phmo		58-123-176	24-30-33	Low	Low	Year,MD-E	M.High
Psme/Syor1	9-27-51	87-132-167	26-36-50	M.High	M.Low	Win,E-MD	High to V.High
Psme/Jaam		108-132-190	21-27-36	V.Low	V.Low	Win,E-MD	Moderate
Psme/Acgl	32-77-139	117-203-307	42-62-100	Low	Moderate		
Psme/Quga		93-146-175	47-54-61[a]	Fair	M.Fair	Year,MD	M.High
Psme/Pamy		115-190-319	31-41-50	V.Low	M.Low	Trans, MD-E	Moderate to High
Psme/Aruv-Juco	22-34-57	35-136-174	21-28-35 24-41-58[b]	Low	M.Low	Spr,BH Win,MD-E	V.Low M.High
Psme/Cage1	20-46-86	72-191-320	24-41-59	Fair	M.Fair	Year,MD-E	M.High
Poan3/Saex-Befo		126-194-249		Moderate	M.Low		
Poan3/Amal				Low	M.Low	Year,MD-E	M.High

a. Site index for Psme at 100 yr.
b. Site index for Pipo at 50 yr.

P.A. OR PHASE NAME	TREE PROD ft^3/ac/yr (PNC)	B.A. ft^2/ac	S.I. SP./BY POTR1/80	LIVESTOCK FGE PROD (PNC)	LIVESTOCK FGE PROD (MIDSERL)	BIG GAME HABITAT KIND	BIG GAME HABITAT POTENTL
Potr1/Lale		198-228-257	-64-	M.Low	Low	Sum,E-MD	Low to Moderate
Potr1/Ceve				Moderate	Moderate		
Potr1/Caru1	5-19-34	61-132-210	40-59-75	M.High 1067 lb	Moderate		
Potr1/Feth		125-157-263		High	M.High	Year,MD-E	Moderate
Potr1/Amal-Prv1	9-27-48	97-173-267		M.High 1370 lb	M.High	Win,MD Year,MD	High Moderate
Potr1/Vete		121-187-288		M.Low	Moderate		
Potr1/Ptaq		70-152-232		Mod.[c]	M.Low[c]	Year,E-MD	Mod. to High
Potr1/Syor1	9-23-39	53-141-251	40-60-78	Mod. 967 lb	M.High	Spr-Fall E-MD	High
Potr1/Hesp	13-23-41	95-169-245		M.High 1190 lb	Moderate	Sum,E-MD	High to V.High
Potr1/LIGU	10-18-25	105-185-286	-63-	M.High 1180 lb	M.High	Sum,E-MD	High
Potr1/Thfe1	12-25-43	76-183-312	25-60-81	Moderate 627 lb	M.High	Sum,E-MD Win,E-MD	V.High V.High
Potr1/Cage1	10-29-46	111-178-281	36-51-75	Moderate 670 lb	Moderate	Sum,E-MD	High in fall
Jusc/Cemo		14- 21- 29		M.Low	Low	Win,MD	V.High to critical
Jusc/Putr		16- 21- 24		Low	Low	Win,MD	V.High
Jusc/Agsp				Low 357 lb	Fair	Win,MD	High to critical
Jusc/Artr		10- 21- 33		Low	Low		
Juos-Pied/Agsp1				Good	Fair		
Pied-Juos/Artr				M.Low 500 lb	Good	Win,MD	High
Juos/Orhy				Low 350 lb	Fair	Win,MD	High to V.High
Juos/Cemo-Pera2		26- 52- 80		Low	M.Low		
Pied-Juos/Amut-Cemo		62-103-128		V.Low	Low		
Pied/Quga		23- 42- 57		Low 125 lb	Fair	Year,MD	Moderate to High

c. Much of the production is in bracken fern, a plant poisonous to cattle and sheep.